

CLAIMS

What is claimed is:

- 5 1. An extrusion head assembly for continuous extrusion of a primary molten polymer in a predetermined shape and a secondary molten polymer in a stripe inserted into said predetermined shape, the primary and secondary molten polymers being supplied from first and second sources, comprising:
- 10 a) a fixed member for conveying said primary molten polymer in an annular stream axially of an axis of said head assembly, said fixed member including a body element;
- b) a manifold block disposed against said body element, said manifold block including a distribution channel for receiving and distributing said secondary polymer;
- c) a wear plate disposed against said manifold block; and
- 15 d) a die sub-assembly rotatably disposed on said body element for receiving said annular stream of primary molten polymer from said fixed member and extruding said predetermined shape, said die sub-assembly including an extrusion die in contact with said wear plate and having an opening for extruding said predetermined shape and having means for communicating with said distribution channel to receive said
- 20 secondary polymer therefrom to form said inserted stripe, said sub-assembly further including means for rotating said die about said axis,
- wherein said sub-assembly includes spring means for axially loading said extrusion die against said wear plate.
- 25 2. An extrusion head assembly in accordance with Claim 1 wherein said fixed member includes a mandrel disposed in said body element and supporting an extrusion tip.

3. An extrusion head assembly in accordance with Claim 2 wherein said mandrel and said extrusion tip have axial passages therethrough.

4. An extrusion head assembly in accordance with Claim 1 wherein said spring means includes a Belleville washer.

5. An extrusion head assembly in accordance with Claim 1 wherein said wear plate is formed from a dry-lubricating, low-friction material.

6. An extrusion head assembly in accordance with Claim 5 wherein said material is selected from the group consisting of bronze and a polymer.

7. An extrusion head assembly in accordance with Claim 1 wherein said means for rotating includes a worm gear.

8. An extrusion head assembly in accordance with Claim 1 wherein said body element includes a counterbore, and wherein said manifold plate, wear plate, and die are disposed in said counterbore.

9. An extrusion head assembly in accordance with Claim 1 wherein said die sub-assembly further includes a hub for engaging said means for rotation and for supporting said die.

10. An extrusion head assembly in accordance with Claim 9 wherein said die is mounted on pins to be axially slidable of said hub.

11. An extrusion head assembly in accordance with Claim 1 wherein said means for rotating further comprises bearings for rotatably supporting said die sub-assembly on said body element.

12. An extrusion head assembly in accordance with Claim 11 wherein said bearings include a ball bearing assembly.

5 13. An extrusion head assembly in accordance with Claim 1 wherein said means for communicating with said distribution channel in said manifold block include an annular secondary polymer distribution channel in said one of said wear plate and said die, at least one nozzle outlet, and a channel connecting said secondary polymer distribution channel to said nozzle outlet.

10 14. An extrusion head assembly in accordance with Claim 13 comprising a plurality of said connecting channels and said nozzle outlets in communication with said annular secondary polymer distribution channel.

15 15. A method for forming an elongate element having a cylindrical shape formed of a primary polymer and having at least one stripe formed of a secondary polymer, comprising the steps of:

20 a) providing an extrusion head having a fixed member for conveying molten primary polymer axially of said head, and having a die sub-assembly including a die rotatably disposed against a wear plate on said fixed member for receiving molten secondary polymer and extruding said molten polymers, said die having a central passage for conveying said primary polymer and at least one nozzle outlet in communication with said central passage for conveying said secondary polymer to form said stripe, said sub-assembly further including a spring for urging said die against said wear plate; and

25 b) extruding said primary and secondary polymers from said die to form said elongate striped element.

16. A method in accordance with Claim 15 comprising the further step of rotating said die during said extruding step such that said elongate striped element is spirally striped.

5 17. A method in accordance with Claim 15 wherein said elongate striped element is tubular and said die includes a central opening, comprising the further step of passing air through said opening during extrusion of said polymers to support said tubular shape.

10 18. A method in accordance with Claim 15 wherein said elongate striped element is tubular and said die includes a central opening, comprising the further step of passing a core material through said opening during extrusion of said polymers to coat said core material.

15 19. An elongate extruded element comprising a cylindrical shape formed of a primary polymer and having at least one stripe formed of a secondary polymer, said element being formed in accordance with the method of Claim 15.

20 20. An element in accordance with Claim 19 wherein said stripe is spirally disposed around said cylindrical element.

 21. An element in accordance with Claim 19 wherein said shape is selected from the group consisting of a rod and a tube.

25 22. An element in accordance with Claim 19 wherein said element further comprises a core material within said cylinder.

 23. An element in accordance with Claim 22 wherein said core material is selected from the group consisting of rod, tube, wire, and lumber.